

1 August 1963

OSI MEMORANDUM

Technical Background on Foot and Mouth Disease (FMD)
(Aphthous fever, fievre af Tosa, Maul-und-Klauenseuche)

DEFINITION

Foot-and-Mouth Disease (FMD) is an acute, highly communicable virus disease chiefly confined to cloven-hoofed animals both domestic and wild. Cattle and swine are most susceptible, sheep and goats less so. Other animals such as buffalo, camel, deer, antelope are also susceptible. Dogs, cats, rabbits can be infected artificially but probably are not important in its spread. Man is rarely infected, however, he can spread the disease by means of contaminated skin, clothing, shoes or other articles that contact infected animals.

There are seven distinct types of the virus, namely A, O, C, South African Type (S.A.T.) 1, 2, 3 and Asian Type 1. All are different immunologically and there are variants within the types.

CAUSE AND SPREAD

FMD is found in most parts of Europe, Asia, Africa and South America. It is fairly prevalent in the USSR.

It has not become established in other regions such as North and Central America, Great Britain, Australia and New Zealand. Outbreaks have occurred in the United States and Mexico. The last outbreak in the U. S. occurred in 1929 and was finally eradicated in 1930. During the period 1946-1952 over \$150,000,000 were spent by the United States to combat a wide-spread outbreak of FMD in Mexico. The U. S. Government believed it important to fight the disease in Mexico to prevent its spread to our livestock industry where greater losses could have occurred.

Spread of the disease is by contact with infected animals or contaminated articles, including hay, straw, feed, etc. The virus is found in the blisters in the mouth and between the toes of the animals hoofs. It is also found in the blood, saliva, urine, milk, feces, meat, lymph glands and bone. Susceptible animals are readily infected by direct contact with such materials.

The severity of the disease varies with the strain of the virus and the susceptibility of the animal population. The disease spreads rapidly within a herd and 100% of the animals usually become infected. The death rate is normally low, usually not over 5%, but may go as high as 50% in the malignant form of the disease.

DIAGNOSIS

Recognition of the disease in the U. S. and in countries where the disease has not occurred is of paramount importance. The disease may be confused with Vesicular Stomatitis or Vesicular Exanthema until differential diagnosis in properly equipped laboratories is undertaken.

CONTROL

Not only diagnosis, but control of FMD in the U. S. and many countries comes under supervision of government agencies. Control in such countries consists of: (1) quarantine of premises involved, (2) slaughter and disposal by burying or burning of all infected and susceptible animals exposed to the disease, (3) thorough cleaning and disinfection of areas and objects contaminated, (4) testing of premises by restocking with susceptible livestock.

The virus of FMD is destroyed by alkalies and formalin. 2% lye (sodium hydroxide) solution or 4% sodium carbonate solution is recommended.

PREVENTION AND TREATMENT

Treatment of FMD in the U. S. is absolutely forbidden. Under federal law, infected animals must be destroyed. Vaccines and sera must not be used. These same regulations exist in many countries. Deportation of FMD vaccines into the U. S. is prohibited by Congressional decree. The only place permitted to carry on FMD investigation is at the U.S.D.A. laboratories at Plum Island, New York.

In continental Europe, Asia, Africa and South America, where the disease continues to exist and it is not economically possible to slaughter all infected animals, control is based on a modified system of quarantine and vaccination, using vaccines specific for the type of virus involved.

Vaccines prepared from FMD virus grown in cattle or in tissue culture, adsorbed on aluminum hydroxide gel and inactivated with formalin have been used with some success in these modified control programs. Vaccines are presently being used in South America, most of continental Europe, USSR, Turkey, Africa and Asia. In these countries treatment is directed towards promoting rapid healing of the lesions and preventing secondary infection. The immunity produced by vaccines is usually not over one year in the best vaccines and animals must be revaccinated. Where more than one type of the virus occurs a polyvalent vaccine must be used. For example, in East Germany a vaccine containing types O, A, and C must be used for complete protection. Production of these polyvalent vaccines is naturally more complicated and costly than where only one type of FMD exists.